

## LISTING OF CLAIMS

This listing of claims will replace all prior versions and listings of claims in the Application.

1. **(Currently Amended)**: A processing apparatus comprising:
  - an operation section configured to perform an operation in accordance with a method of designing an optical system using an evaluation function;
  - an input section which inputs information required for the operation;
  - an output section which outputs an operation result; and
  - a memory section which memorizes the operation result,wherein the method of designing an optical system comprises:
  - setting an initial-value that sets a value of an optical parameter in a design state where a production error has not been taken into consideration,
  - ~~generating/renewing production state that generates a value of the optical parameter in a production state by adding a production error to the optical parameter in the design state, or renewing the production error of the optical parameter in an existing production state,~~
  - ~~generating an evaluation function that generates an evaluation function, [[and]]~~
  - performing optimization by determining an optimal value of [[the]] an optical parameter in a production state, which is produced by adding a production error to the optical parameter in the design state, by optimizing using the evaluation function, and
  - renewing a production state by renewing the production error included in the optimal value of the optical parameter in the production state that has been determined by the performing optimization, to determine a new value of the optical parameter in the production state.

2. **(Currently Amended):** The processing apparatus according to claim 1, wherein:

in the ~~generating/renewing production state~~ the production state, an amount of the production error to be applied is acquired on a basis of a value in a error-amount table, which has been preliminarily prepared according to a requirement for acquisition of an amount of a production error, ~~to newly generate the optical parameter in the production state by applying the amount of the production error to the optical parameter in the design state or to renew a value of the amount of the production error, which has been applied to generate the optical parameter in the existing production state, according to a change of the optical parameter in the design state and the amount of the production error as acquired is used for renewal of the production error included in the optical parameter in the production state.~~

3. **(Previously Presented):** The processing apparatus according to claim 1, wherein:

in the generating evaluating-function, at least one parameter representing sensitivity to production error, which parameter is defined by optical performance in the design state and optical performance in the production state, is incorporated as an evaluation parameter in the evaluation function.

4. **(Currently Amended):** A processing apparatus comprising:

an operation section for performing an operation in accordance with a method of designing an optical system;

an input section which inputs information required for the operation;

an output section which outputs an operation result; and

a memory section which memorizes the operation result,

wherein the method of designing an optical system ~~comprising~~ comprises:

setting an initial-value which sets up a value in a design state as a value of an optical parameter,

generating a production-state which sets a value in a production state as a value of the optical parameter,

~~generating an evaluation function that generates~~ an evaluation function using the production state as a variable, and

performing optimization by optimizing the value in the production state using the evaluation function,

wherein, in the generating the production state, the value in the production state is set up by adding a predetermined amount of production error, which is determined on a basis of a value in an error-amount table, to the value in the design state.

5. **(Cancelled):**

6. **(Currently Amended):** The processing apparatus according to claim [[5]]4, wherein values in the error-amount table are set on a basis of actual production capability.

7. **(Currently Amended):** The processing apparatus according to claim [[5]]4, wherein the error-amount table is composed as a combination of one or more production errors and one or more optical parameters.

8. **(Currently Amended):** The processing apparatus according to claim [[5]]4, wherein the error-amount table contains one or more production errors including at least one of Newton error, astigmatism, wall thickness error, a tilt eccentricity, and a shift eccentricity.

9. **(Currently Amended):** The processing apparatus according to claim [[5]]4, wherein the error-amount table contains one or more optical parameters including at least one of radius of curvature, a lens thickness, and interlens interval.

10. (**Currently Amended**): The processing apparatus according to claim [[5]]4, wherein a possible range of an optical parameter is divided into two or more numerical value ranges in the error-amount table.

11. (**Previously Presented**): The processing apparatus according to claim 10, wherein an amount of error is set for each of the two or more numerical value ranges in the error-amount table.

12. (**Previously Presented**): The processing apparatus according to claim 4, further comprising a renewing the production-state that renews the amount of the production error to a new value in accordance with a change of the value of the optical parameter in a design state, on a basis of the error-amount table.

13. (**Cancelled**)

14. (**New**) The processing apparatus according to claim 1, wherein the performing optimization and the renewing a production state are iterated.